

## THE CLAIMS

What is claimed is:

1. A data storage subsystem, comprising:  
three data storage units;  
three check storage units; and  
an array controller coupled to the three data storage units and the three check storage units, the array controller determining the contents of the check storage units so that any three erasures of the data storage units and the check storage units can be corrected by the array controller.
2. The data storage subsystem according to claim 1, wherein information is stored on the data storage subsystem as a symmetric Maximum Distance Separation code.
3. The data storage subsystem according to claim 2, wherein the Maximum Distance Separation code is a Winograd code.
4. The data storage subsystem according to claim 2, wherein the Maximum Distance Separation code is a Reed-Solomon code.
5. The data storage subsystem according to claim 2, wherein the Maximum Distance Separation code is an EVENODD code.
6. The data storage subsystem according to claim 2, wherein the Maximum Distance Separation code is a derivative of an EVENODD code.
7. The data storage subsystem according to claim 1, wherein the array controller updates a block of data contained in any one of the data storage units and the check storage

units using only six IO operations while determining the contents of the check storage units so that any three erasures of the data storage units and the check storage units can be corrected by the array controller.

8. The data storage subsystem according to claim 7, wherein two of the IO operations are read operations and four of the IO operations are write operations.

9. The data storage subsystem according to claim 7, wherein the read operations read data from the data storage units that are not being updated, and the four write operations write data to the data storage unit being updated and to the three check storage units.

10. The data storage subsystem according to claim 1, wherein failure of any three data storage units and check storage units failures can occur before data stored on the data storage subsystem is lost.

11. The data storage subsystem according to claim 1, wherein data is recoverable from a partially readable storage unit.

12. The data storage subsystem according to claim 1, wherein the array controller can recover any data stored on the data subsystem when all three data storage units have failed.

13. A method of updating data stored on a data storage subsystem, the data storage subsystem including three data storage units, three check storage units and an array controller coupled to the three data storage units and the three check storage units, the array controller determining the contents of the check storage units so that any three erasures of the data storage units and the check storage units can be corrected by the array controller, the method comprising steps of:

ARC9-2003-0040-US1

reading complementary data from the two data storage units that are not being updated; and

writing data to the data storage unit being updated and to the three check storage units.

14. The method according to claim 13, wherein information is stored on the data storage subsystem as a symmetric Maximum Distance Separation code.

15. The method according to claim 14, wherein the Maximum Distance Separation code is a Winograd code.

16. The method according to claim 14, wherein the Maximum Distance Separation code is a Reed-Solomon code.

17. The method according to claim 14, wherein the Maximum Distance Separation code is an EVENODD code.

18. The method according to claim 14, wherein the Maximum Distance Separation code is a derivative of an EVENODD code.

19. The method according to claim 13, wherein failure of any three data storage units and check storage units failures can be occur before data stored on the data storage subsystem is lost.

20. The method according to claim 13, further comprising a step of recovering data from a partially readable storage unit.